

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s):	SPECTOR, Tomer	Examiner:	RODEE, Christopher D.
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Title:	LIQUID DEVELOPER MANUFACTURE PROCESS		
HP Docket No.	200500106-1		

REPLY BRIEF

Mail Stop Appeal Brief - Patents

Commissioner for Patents
P.O. Box 1450
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Sir:

This Reply Brief is being filed in response to the Examiner's Answer dated January 15, 2010, issued by the United States Patent and Trademark Office in connection with the above-identified Application. A response to the January 15, 2010 Office Action is due March 15, 2010. Accordingly, this Reply Brief is being timely filed.

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I. REAL PARTY IN INTEREST

The Real Party in Interest is Hewlett-Packard Company, Inc., the parent company of assignee Hewlett-Packard Development Company, L.P.

II. RELATED APPEALS AND INTERFERENCES

Appellant, Appellant's undersigned legal representative, and the assignee of the pending application are not aware of any appeals, interferences, or judicial proceedings which may be related to, directly affect, or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF THE CLAIMS

Claims 1-4, 6-19, and 21-27 are pending in the application with claims 5 and 20 previously cancelled. All pending claims stand finally rejected by the Examiner in the Final Action dated March 13, 2009 at the time of the appeal. All pending claims are therefore the subject of this appeal. A copy of the appealed claims as they currently stand is provided in Section VIII.

IV. STATUS OF AMENDMENTS

An amendment to claims 2, 3, 13, 16, 19, 26, and 27 was made in the Response to Office Action filed on December 11, 2008 and was entered by the Examiner. No subsequent amendments have been filed.

V. SUMMARY OF CLAIMED SUBJECT MATTER

A summary of the subject matter defined in each of the independent and dependent claims involved in the appeal follows with reference to the original specification.

Claim 1 sets forth a method of creating a liquid developer with improved conductivity including dissolving a solid charge adjuvant in a carrier liquid aided by heating the carrier liquid, then mixing the dissolved charge adjuvant with a thermoplastic resin and carrier liquid, grinding the mixture to form toner particles, and adding a charge director to charge the toner particles. (P. 3, II. 26-31.)

Claim 2 depends from claim 1 and sets forth that the mixing and grinding include mixing the thermoplastic resin with carrier liquid, heating the mixture of carrier liquid and thermoplastic resin to plasticize the resin, cooling the plasticized resin, adding the dissolved charge adjuvant to the cooled plasticized resin, and grinding the mixture of charge adjuvant and plasticized resin to form toner particles. (P. 3, I. 32 to p. 4, I. 3.)

Claim 3 depends from claim 1 and sets forth that the mixing and grinding includes mixing the thermoplastic resin with carrier liquid and dissolved charge adjuvant at an elevated temperature, cooling the mixture, and grinding the cooled mixture to form toner particles. (P. 4, II. 4-8.)

Claim 4 depends from claim 1 and sets forth adding a colorant. (P. 4, I. 9).

Claim 6 depends from claim 1 and sets forth that the charge adjuvant is a metallic soap. (P. 4, I. 10.)

Claim 7 depends from claim 6 and sets forth that the metallic soap is an aluminum soap. (P. 4, II. 10-11.)

Claim 8 depends from claim 6 and sets forth that the metallic soap includes an aluminum stearate. (P. 4, I. 11.)

Claim 9 depends from claim 7 and sets forth that the aluminum stearate includes aluminum tri-stearate. (P. 4, I. 12.)

Claim 10 depends from claim 1 and sets forth that the dissolving is aided by heating to a temperature exceeding 120°C. (P. 4, II. 13-14.)

Claim 11 depends from claim 1 and sets forth that the dissolving is aided by heating to a temperature exceeding 130°C. (P. 4, II. 14.)

Claim 12 depends from claim 1 and sets forth that the dissolving is aided by heating to a temperature of no greater than 130°C. (P. 4, II. 14-15)

Claim 13 depends from claim 1 and further includes cooling the dissolved charge adjuvant to a temperature below 60°C, prior to mixing it with the resin. (P. 4, II. 16-17.)

Claim 14 depends from claim 1 and sets forth that the charge adjuvant has only limited solubility in the carrier liquid at 25°C. (P. 4, II. 18.)

Claim 15 depends from claim 1 and sets forth that the charge adjuvant is substantially insoluble in the carrier liquid at 25°C. (P. 4, II. 19.)

Claim 16 depends from claim 1 and sets forth that the charge adjuvant does not dissolve in the carrier liquid at a temperature at which it is mixed with the resin, but remains dissolved therein, when dissolved at a higher temperature. (P. 4, II. 20-22.)

Claim 17 depends from claim 1 and sets forth that the charge adjuvant does not substantially dissolve in the carrier liquid at 40°, but remains dissolved therein, when dissolved at a higher temperature. (P. 4, II. 23-24.)

Claim 18 depends from claim 1 and sets forth that the charge adjuvant does not substantially dissolve in the carrier liquid at 60°, but remains dissolved therein, when dissolved at a higher temperature. (P. 4, II. 23-24.)

Claim 19 depends from claim 1 and sets forth that the dissolving further includes adding a surfactant to the solution of carrier liquid and charge adjuvant. (P. 4, II. 25-26.)

Claim 21 depends from claim 1 and sets forth that the mixing and grinding are performed in a same grinder or a same attritor. (P. 4, II. 27-28.)

Claim 22 depends from claim 1 and sets forth that the mixing is performed in a first vessel and the grinding is performed in a second vessel. (P. 4, II. 29-30.)

Claim 23 depends from claim 22 and sets forth that the mixing is performed in a mixer without grinding media. (P. 4, II. 30-31.)

Claim 24 depends from claim 21 and sets forth that the grinding is performed in a grinder or an attritor. (P. 4, I. 32.)

Claim 25 depends from claim 2 and sets forth that the dissolving is aided by heating to a temperature exceeding 120°C. (P. 4, I. 13-14.)

Claim 26 depends from claim 3 and sets forth that the dissolving is aided by heating to a temperature exceeding 120°C. (P. 4, I. 13-14.)

Claim 27 depends from claim 10 and further includes cooling the dissolved charge adjuvant to a temperature below 60°C, prior to mixing it with the resin. (P. 4, II. 16-17.)

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Did the Examiner properly reject claims 1-4, 6-19, and 21-27 under 35 U.S.C. §103(a) as being obvious over GB 1,086,753 (hereinafter, GB '753) in view of Diamond, *et al.*, Handbook of Imaging Materials (hereinafter, Diamond)?

VII. REPLY

The Examiner rejected claims 1-4, 6-19, and 21-27 under 35 U.S.C. §103(a) as being obvious over GB '753 in view of Diamond. Specifically, the Examiner asserted that GB '753 discloses a process of forming a liquid developer concentrate by dissolving an aluminum tristearate salt in odorless mineral spirits. The Examiner further asserted that “the amine added in the disclosure on GB page 1 also appears to be a charge director and this component is added to the toner particles.” The Examiner acknowledged that “[t]he reference does not specifically disclose that the resin is a thermoplastic resin,” but relies on Diamond for this feature. Accordingly, the Examiner finds that it would have been obvious to modify the references to arrive at the claimed invention. The rejections should be reversed at least for the following reasons.

1. **No suggestion or motivation for dissolving a charge adjuvant “prior to” the steps of mixing with resin, grinding to form toner particles, and adding a charge director.**

Appellants note that claim 1 recites “a method of creating a liquid developer with **improved conductivity** comprising: dissolving a solid charge adjuvant in a carrier liquid...**then** mixing **the dissolved charge adjuvant** with a thermoplastic resin and carrier liquid, grinding the mixture to form toner particles, and adding a charge director to charge the toner particles.” [emphasis added]. Accordingly, the claimed invention is directed to the step of dissolving a charge adjuvant prior to the steps of mixing with resin, grinding the mixture, and adding a charge director. Nowhere does GB '753 disclose, teach or suggest this “sequence” of multiple steps to improve conductivity of liquid developer. Rather GB '753 relates only to dissolving both aluminum salt and amine “together at the same time” in a single step in order to make a liquid developer.

It appears that the Examiner relies on page 1, lines 68-74, and page 3, Example 1 of GB ‘753. However, these relied upon portions do not disclose or teach the claimed sequence of multiple steps. Specifically, GB ‘753 at page 1, lines 53-74 describes as follows:

According to the present invention, a liquid toner composition, for developing an electro-static image, comprises finely divided toner particles suspended in an insulating liquid having **dissolved therein, a mixture of (1) a metal salt** of an organic acid, wherein the metal has a valency of 3 to 4, **and (2) an amine...**

While both materials (1) and (2) must be present and should be in solution at the temperature used for image development the amounts thereof are not critical if used in effective quantities which do not seriously lower the dielectric properties of the resulting solution in the insulating liquid...

[emphasis added]. See page 1, lines 53-74.

GB ‘753, at page 2, lines 20-40 describes as follows:

As the second additive (2), any organic amine...can be used...examples include...polymeric amines such as Lube Oil 564...

[emphasis added]. See GB ‘753, at page 2, lines 20-40.

GB ‘753, at page 3, Example 1 describes as follows:

The foregoing concentrates [toner, odorless mineral spirits (OMS), aluminum tristearate, and lube oil amine] were prepared by **dissolving the aluminum salt and the Lube oil 564** in the OMS, adding the toner particles, and ballmilling the mixture in a porcelain mill with steel balls for sixteen hours.

[emphasis added]. See GB ‘753, at page 3, Example 1, lines 1-7.

Therefore, at the most, GB ‘753 relates only to dissolving two additives, both aluminum salt and amine, “together at the same time” in a single step in order to make a liquid developer. The Examiner appears to interpret that the GB’s amine is a charge director and GB’s aluminum stearate is a charge adjuvant. Appellants respectfully disagree for the reasons discussed in

Section 2 below. For the sake of argument, even if the Examiner's interpretation is correct, GB would relate only to dissolving both charge adjuvant (i.e., aluminum tristearate) and charge director (i.e., lube oil amine), "together at the same time" in a single step to make a liquid developer. In contrast, the claimed invention, as discussed above, is directed to the step of dissolving a charge adjuvant prior to the steps of mixing with resin, grinding the mixture, and adding a charge director.

Appellants respectfully note that "improved conductivity" of the liquid developer by the claimed step of dissolving a charge adjuvant prior to the other claimed multiple steps in the sequence is surprising, unexpected and unpredictable in light of the GB's one single step mixing the components because prior dissolution of adjuvant as well as multiple steps provide varying chemical and physical environments for the mixing molecules and the molecules respond differently to varying chemical and physical environments.

The Examiner acknowledges that "[GB] does not disclose the addition of a charge director as the last step of the process," but asserts that "the claims are not so limited." *See Answer, page 3, lines 18-20.* In response, Appellants note that claims clearly recite "dissolving a solid charge adjuvant in a carrier liquid...**then mixing the dissolved charge adjuvant** with a thermoplastic resin and carrier liquid, grinding the mixture to form toner particles, and adding a charge director to charge the toner particles." [emphasis added]. Accordingly, claims clearly recite the step of dissolving a charge adjuvant as a prior step, and the step of adding a charge director, as a later step in the sequence.

Diamond does not and is not asserted to cure the defects in GB '753 discussed above. Rather, Diamond relates only to resins for making liquid developers.

Therefore, neither GB '753 nor Diamond, either alone or in combination, disclose or teach the step of dissolving a charge adjuvant prior to the steps of mixing with resin, grinding the mixture, and adding a charge director.

2. No suggestion of dissolving any charge adjuvant.

The subject matter of claim 1 is described above. The Office Action finally rejects claim 1, incorporating by reference the prior reasons for rejection made in the September 17, 2009 Office Action, and alleges that GB '753 discloses using aluminum tristearate in a method of making liquid toner. The Office Action also alleges that aluminum tristearate is well-known as a charge adjuvant and the specification of the subject application describes this knowledge in the art. Because the prior art as well as the specification recognize aluminum tristearate as a charge adjuvant, the Office Action assumes that GB '753 thus discloses dissolving a charge adjuvant in the method of making liquid toner. Appellant traverses the Office's assumption as being inconsistent with the knowledge of those of ordinary skill, as evidenced by the cited art.

Appellants note that the role of aluminum tristearate in GB '753 is NOT a charge adjuvant. Specifically, GB '753 states that its invention pertains to positively charged particles. *See* page 1, lines 47-52 of GB '753. Appellants note that the 5th full paragraph on page 244 of Diamond lists aluminum tristearate as a charge director (charge control agent), instead of a charge adjuvant, for positive toners. Additionally, page 1, line 20 of the original specification of GB '753 incorporates by reference US Patent No. 4,707,429, which lists metallic soaps as charge directors, instead of charge adjuvants, for positive toners in col. 5, II. 6-9. Since aluminum tristearate is a metallic soap, it follows that those of ordinary

skill would consider it to function as a charge director for the positively charged particles in GB '753.

The Office Action alleges that the amine listed on p. 1, I. 60 of GB '753 could instead be the charge director, but does not present evidence in support of the conclusion. Neither Diamond nor US 4,707,429 include amines in their lists of suitable charge directors for positive toners. While Diamond may be considered to describe generally the use of a charge director, such does not constitute establishing that the amine in GB '753 functions as a charge director. Instead, the prior art supports the conclusion that aluminum tristearate would function as the GB '753 charge director. Indeed, Diamond itself expressly supports such a conclusion.

The Office otherwise fails to provide substantial evidence in support of its allegations. Under the Administrative Procedure Act (APA) applicable to the Office's allegation, the standard of review applied to findings of fact is the "substantial evidence" standard. See, In re Gartside, 203 F.3d 1305, 1315, 53 USPQ2d 1769, 1775 (Fed. Cir. 2000). See also MPEP § 2144.03 (2007). Essentially, the Office's allegations appear to assume it is well-known that aluminum tristearate is a charge adjuvant for positively charged particles and amine is a charge director. Appellant asserts these facts are not well known. It is not permissible for the Office to base rejections on unsupported assumptions.

The functional difference between charge adjuvants and charge directors is significant and is explained at least at page 5, lines 15-34 of the specification of subject application.

The Office Action does not establish with substantial evidence that those of ordinary skill would consider the aluminum tristearate in GB '753 to function as a charge adjuvant.

Rather, without supportive evidence, the Office Action assumes that aluminum tristearate necessarily functions as a charge adjuvant in GB '753 merely because it is known generally as a charge adjuvant.

It does not necessarily follow that aluminum tristearate functions as a charge adjuvant in GB '753. "The mere fact that a certain thing may result from a given set of circumstances is not sufficient to establish inherency." In re Riickaert, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) [emphasis in original]; MPEP § 2112. Further, "[i]n relying upon the theory of inherency, the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." Ex parte Lew, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) [emphasis added]; MPEP § 2112.

In the Answer, the Examiner acknowledges that "aluminum tristearate may have more than one function in the liquid developer art – as a charge adjuvant...and as a charge director," but makes a mere assertion that the same compound is disclosed in GB document as a charge adjuvant. *See* page 6, lines 17-21 of the Answer. In response, Appellants note that the role of aluminum tristearate in GB '753 is not a charge adjuvant, for the same reasons discussed above.

In the Answer, the Examiner further notes that "the GB document includes a step of dissolving aluminum tristearate in solution in the liquid developer" and "[t]he use of aluminum stearate as charge adjuvants is widely described in the literature." *See* page 6, lines 2-10 of the Answer. For the sake of argument, in accordance with the Examiner's assumption, even if GB '753's aluminum tristearate is a charge adjuvant, it is not dissolved alone, rather mixed along with lube oil amine, "together at the same time" in a single step. In contrast, the claimed

invention, as discussed above, is directed to the step of dissolving a charge adjuvant prior to the steps of mixing with resin, grinding the mixture, and adding a charge director.

At least for such reasons, the cited combination cannot be considered to suggest dissolving a solid charge adjuvant in a carrier liquid prior to mixing with resin and grinding to form toner particles, as set forth in claim 1.

3. No reasonable expectation of success in modifying GB '753.

As explained at page 5, lines 15-34 of the specification of subject application, the charging of toner particles is a complex process. In general, most resins do not charge easily, even when a charge director is used. To aid in charging, a charge adjuvant may be incorporated in the toner particles. Various theories of charging exist, which may or may not operate individually or in combination given a particular situation. Also, introduction of a charge director in solution may improve reaction of a charge adjuvant with the resin, resulting in better charging by the charge director. Appellant asserts that those of ordinary skill have no reasonable expectation of success in somehow modifying the teachings of GB '753 to make aluminum tristearate function as a charge adjuvant instead of as a charge director. GB '753 fails even to recognize the separate functions of charge adjuvants and charge directors.

Appellant notes that GB '753 is silent regarding the designation of any charge director or charge adjuvant. GB '753 merely lists compounds without describing their function, except that page 3, lines 36-38 describes a combination of aluminum salt and Lube Oil 564 (polymeric amine) as a "dispersant mixture." The term "dispersant mixture" does not appear to relate in any way to the function of a charge director or charge adjuvant.

The technical knowledge displayed in GB '753 is so rudimentary with regard to the function of the additives that GB '753 cannot be considered to produce a reasonable expectation of success in creating a liquid developer with improved conductivity by dissolving a solid charge adjuvant in carrier liquid before mixing with resin and grinding to form toner particles, as set forth in claim 1. Though Diamond describes liquid toner composition, preparation, properties, charging, etc., Diamond does not remedy the deficiency in GB '753 of failing to contemplate the function of the additives except as a "dispersant mixture." At least for these reasons, Appellants respectfully request reversing the rejections.

4. Unexpected results.

Appellant notes that claim 1 expressly requires dissolving a solid charge adjuvant in a carrier liquid aided by heating, then mixing the dissolved charge adjuvant with a thermoplastic resin and carrier liquid, and grinding the mixture to form toner particles. Comparative examples (page 7, lines 23-31 of the original specification) that use a charge adjuvant, but do not include first dissolving a solid charge adjuvant in a carrier liquid, fail to produce (page 8, lines 7-9) the increased conductivity shown in Fig. 5 of the original specification. Also, Fig. 5 shows (page 8, lines 10-12) that the comparative examples require a longer grinding time for a particular required conductivity.

In the Answer, the Examiner asserts that "[t]his is not an effective comparative example because the applied GB document does dissolve aluminum stearate in a carrier liquid." In response, Appellants note that Figure 5 of the subject application clearly shows that the invention yielded "improved conductivity" and the particle conductivity of the invention is more than 160

units. This degree of increase in particle conductivity is surprising, unexpected, and unpredictable in light of GB ‘753 and Diamond, either alone or in combination.

Nowhere does GB ‘753 disclose or teach that its method would yield the particle conductivity of as high as 160 units. As explained above, although GB ‘753 relates to the use of aluminum stearate for making liquid developer, its role in GB ‘753 is not a charge adjuvant. For the sake of argument, even if it is charge adjuvant, it is not dissolved alone, rather mixed along with lube oil amine, “together at the same time” in a single step. In contrast, the claimed invention, as discussed above, is directed to the step of dissolving a charge adjuvant prior to the steps of mixing with resin, grinding the mixture, and adding a charge director, so as to yield “improved conductivity” in liquid developer.

As discussed above, Diamond does not and is not asserted cured the defects in GB ‘753, and therefore neither GB ‘753 nor Diamond, alone or in combination, teach or suggest the claimed invention.

As such the rejection is believed moot, and reversal of the rejection is thus respectfully requested.

CONCLUSION

It is respectfully submitted, in light of the above, that none of the claims are properly rejected. Therefore, reversal of the rejection is respectfully requested.

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Respectfully submitted,

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VIII. CLAIMS APPENDIX

APPEALED CLAIMS:

1. (Original) A method of creating a liquid developer with improved conductivity comprising:
 - dissolving a solid charge adjuvant in a carrier liquid aided by heating the carrier liquid;
 - then mixing the dissolved charge adjuvant with a thermoplastic resin and carrier liquid;
 - grinding the mixture to form toner particles; and
 - adding a charge director to charge the toner particles.
2. (Previously presented) A method according to claim 1 wherein mixing and grinding comprises:
 - mixing the thermoplastic resin with carrier liquid;
 - heating the mixture of carrier liquid and thermoplastic resin to plasticize the resin;
 - cooling the plasticized resin;
 - adding the dissolved charge adjuvant to the cooled plasticized resin;
 - grinding the mixture of charge adjuvant and plasticized resin to form toner particles.
3. (Previously presented) A method according to claim 1 wherein mixing and grinding comprises:

mixing the thermoplastic resin with carrier liquid and dissolved charge adjuvant at an elevated temperature; cooling the mixture; grinding the cooled mixture to form toner particles.

4. (Previously presented) A method according to claim 1, comprising adding a colorant.
5. (Cancelled)
6. (Previously presented) A method according to claim 1, wherein said charge adjuvant is a metallic soap.
7. (Original) A method according to claim 6 wherein the metallic soap is an aluminum soap.
8. (Original) A method according to claim 6, wherein said metallic soap comprises an aluminum stearate
9. (Original) A method according to claim 7 wherein the aluminum stearate comprises aluminum tri-stearate.
10. (Previously presented) A method according to claim 1, wherein said dissolving is aided by heating to a temperature exceeding 120°C.
11. (Original) A method according to claim 1, wherein said dissolving is aided by heating to a temperature exceeding 130°C.
12. (Previously presented) A method according to claim 1, wherein said dissolving is aided by heating to a temperature of no greater than 130°C.
13. (Previously presented) A method according to claim 1 further comprising cooling the dissolved charge adjuvant to a temperature below 60°C, prior to mixing it with the resin.

14. (Previously presented) A method according to claim 1 wherein the charge adjuvant has only limited solubility in the carrier liquid at 25°C.
15. (Previously presented) A method according to claim 1 wherein the charge adjuvant is substantially insoluble in the carrier liquid at 25°C.
16. (Previously presented) A method according to claim 1 wherein the charge adjuvant does not dissolve in the carrier liquid at a temperature at which it is mixed with the resin, but remains dissolved therein, when dissolved at a higher temperature.
17. (Previously presented) A method according to claim 1 wherein the charge adjuvant does not substantially dissolve in the carrier liquid at 40°, but remains dissolved therein, when dissolved at a higher temperature.
18. (Previously presented) A method according to claim 1 wherein the charge adjuvant does not substantially dissolve in the carrier liquid at 60°, but remains dissolved therein, when dissolved at a higher temperature.
19. (Previously presented) A method according to claim 1 wherein the dissolving further comprises adding a surfactant to the solution of carrier liquid and charge adjuvant.
20. (Cancelled)
21. (Previously presented) A method according to claim 1 wherein said mixing and grinding are performed in a same grinder or a same attritor.
22. (Previously presented) A method according to claim 1 wherein said mixing is performed in a first vessel and wherein said grinding is performed in a second vessel.

23. (Original) A method according to claim 22 wherein said mixing is performed in a mixer without grinding media.
24. (Previously presented) A method according to claim 21 wherein said grinding is performed in a grinder or an attritor.
25. (Previously presented) A method according to claim 2, wherein said dissolving is aided by heating to a temperature exceeding 120°C.
26. (Previously presented) A method according to claim 3, wherein said dissolving is aided by heating to a temperature exceeding 120°C.
27. (Previously presented) A method according to claim 10 further comprising cooling the dissolved charge adjuvant to a temperature below 60°C, prior to mixing it with the resin.

IX. EVIDENCE APPENDIX

Not Applicable

X. RELATED PROCEEDINGS APPENDIX

Not Applicable